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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,144	02/06/2006	Aaron M. Gabelnick	63301A	9403

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The Dow Chemical Company
Intellectual Property Section
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EXAMINER	
MILLER, JR, JOSEPH ALBERT	
ART UNIT	PAPER NUMBER
4162	

MAIL DATE	DELIVERY MODE
09/02/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/567,144	GABELNICK ET AL.	
	Examiner	Art Unit	
	JOSEPH MILLER JR	4162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *03/17/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3 and 5 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 6 and 13 of U.S. Patent No. 6,815,014 in view of Koinuma (EP 0617142 A1). Although the conflicting claims are not identical, they are not patentably distinct from each other because in each case a perforated electrode, the use of a tetraaklkylorthosilicate, a glow discharge/corona plasma and moving substrate are claimed in each. Additionally, the flow velocity ranges are overlapping, the silicon compound source concentration would be obvious to vary as a matter of perfecting a thin film. Patent '014 does not mention the specific gas PPM

range as in instant claims, but it would have been obvious to one of ordinary skill in the art at the time of the invention to use the range taught by Koinuma, 33 to 10000ppm TEOS, with the method taught in '014 because it provides a range where deposition rate would be sufficiently high without entering the range where silica particles join together to form a rough, porous film (page 3, lines 22-43).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 5-7, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Babayan (WO00/70117).

Babayan teaches a method of depositing a TEOS film (page 17, lines 1-14) on a substrate using a plasma created between at least two electrodes (page 7, line 19-page 8, line 10.

Babayan teaches that the TEOS may be generated along with oxygen (i.e. "balance gas") (page 17, line 5) and the plasma is created in the region of multiple electrodes (page 7, lines 22-24). The TEOS concentration used was greater than 2000

ppm (page 30, line 23 - page 31, line 1), with the gas speed more than 1.0 m/s (page 15, lines 8-14).

Regarding claim 2, Babayan teaches perforated electrode which allow gases to pass through them (page 11, lines 10-13).

Regarding claim 5, Babayan teaches TEOS.

Regarding claim 6, Babayan teaches a 'balance gas' of oxygen.

Regarding claim 7, Babayan teaches a pressure range of 10.0 to 1000 Torr, therefore including atmospheric pressure (page 7, lines 12-14).

Regarding claim 11, Babayan does not explicitly teach the result of a surface energy of more than 50 dynes/cm, however, since the prior art and the present claims teach all the same process steps, the results of a film with surface energy greater than 50 dynes/cm by applicants process must necessarily be the same as those obtained by the prior art. Therefore by introducing tetraalkylorthosilicate into a glow discharge at named flow rate and ppm levels, it must necessarily result in a film having a surface energy of greater than 50 dynes/cm.

Claims 1 and 9 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Koinuma (EP0617142A1).

Koinuma teaches a method to form a silica thin film by establishing an atmospheric pressure glow discharge beam plasma using an inert gas and trimethoxysilane (abstract).

Koinuma teaches a glow discharge plasma between two electrodes, a balancing gas (hydrogen), a carrier gas (argon), a substrate and a gas flow of 0.26 m/s (Example 1, page 4) based on a flame size of 5mm (page 3, line 24).

Koinuma does not explicitly teach a TEOS concentration of 2,000 to 10,000 ppm, but discusses the volume of TEOS as compared to the carrier gas and hydrogen (page 3, lines 56 - page 4, line 11), but teaches a feed rate of trimethoxysilane of 0.2 SCCM in Example 1 and a range of silane compound source from 0.01 to 2 SCCM, the lower limitation being based on too low of a deposition rate and the upper on the point where silica particles join together and form a rough, porous film (col 3, lines 39-43) therefore it would be inherent and/or obvious to use a TEOS concentration in the named range.

Regarding claim 9, Koinuma teaches that the film is characterized by "transparency" (page 2, lines 43-46).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-11 are rejected under 35 U.S.C. 103(a) as obvious over Gabelnick (WO 03/066932) or Gabelnick in view of Koinuma (EP 0617142 A1).

Gabelnick teaches a process for creating plasma polymerized deposition on a substrate by corona discharge (abstract). Gabelnick teaches a plasma "in a spacing between the electrode and the counter electrode" (page 3, lines 10-15), flowing a mixture gas with a balance gas (page 3, line 26 – page 4, line 3), where the mixture gas may include TEOS (page 4, lines 4-15) at a flow velocity of at least 0.1 m/s (page 4, lines 25-29).

Gabelnick teaches a ppm "preferably" not greater than 2000 ppm, but teaches that the concentration of the working gas in the total gas mixture should be "most

preferably not less than 10 ppm", therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to try a working gas concentration of greater than 2000 ppm, as required by instant claim 1.

Further, Koinuma teaches that the concentration of TEOS can range from 33 to 10000 ppm deposition rate would be sufficiently high without entering the range where silica particles join together to form a rough, porous film (page 3, lines 22-43).

It would have been obvious to one of ordinary skill in the art at the time of the invention to any amount of TEOS up to 10000 ppm as taught by Koinuma because it provides a range where deposition rate would be sufficiently high without entering the range where silica particles join together to form a rough, porous film (page 3, lines 22-43).

Regarding claim 10, Gabelnick teaches that the resulting film is "optically clear" (page 5, lines 23-31).

Regarding claim 11, Gabelnick teaches a example including a resulting surface energy of greater than 50 dynes/cm (page 8, lines 20-24).

Claims 1-11 are rejected under 35 U.S.C. 103(a) as obvious over Gabelnick (US 6,815,014) or Gabelnick in view of Koinuma (EP 0617142 A1).

Gabelnick teaches a process for creating plasma polymerized deposition on a substrate by corona discharge (abstract). Gabelnick teaches a plasma "in a spacing between the electrode and the counter electrode" (page 3, lines 10-15), flowing a

mixture gas with a balance gas (page 3, line 26 – page 4, line 3), where the mixture gas may include TEOS (page 4, lines 4-15) at a flow velocity of at least 0.1 m/s.

Gabelnick teaches a ppm "preferably" not greater than 2000 ppm, but teaches that the concentration of the working gas in the total gas mixture should be "most preferably not less than 10 ppm", therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to try a working gas concentration of greater than 2000 ppm, as required by instant claim 1.

Regarding claim 10, Gabelnick teaches that the resulting film is "optically clear." Regarding claim 11, Gabelnick teaches a example including a resulting surface energy of greater than 50 dynes/cm.

Further, Koinuma teaches that the concentration of TEOS can range from 33 to 10000 ppm deposition rate would be sufficiently high without entering the range where silica particles join together to form a rough, porous film (page 3, lines 22-43).

It would have been obvious to one of ordinary skill in the art at the time of the invention to any amount of TEOS up to 10000 ppm as taught by Koinuma because it provides a range where deposition rate would be sufficiently high without entering the range where silica particles join together to form a rough, porous film (page 3, lines 22-43).

Claims 2-4 are rejected under 35 U.S.C. 103(a) as obvious over Koinuma (EP0617142A1) as applied to claim 1 above and in further view of Yializis (6,118,218).

Koinuma teaches a glow discharge plasma between two electrodes, a balancing gas (hydrogen), a carrier gas (argon), a substrate and a gas flow of 0.26 m/s (Example 1, page 4.

Koinuma does not teach a perforated electrode wherein the treatment gas is flowed through the perforations.

Yializis teaches an atmospheric plasma treatment method forming a glow discharge plasma based on a porous electrode and a counter electrode covered by a dielectric (abstract) which may be used for chemical vapor deposition films (col 10, lines 36-41). Yializis teaches the use of a perforated electrode which allows gas to flow through the perforations (col 5, lines 47-55).

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the use of a perforated electrode taught in the atmospheric plasma treatment method of Yializis to the glow discharge plasma silica film forming method of Koinuma because the distribution allows for the ability to keep the plasma more uniform through gas feed fluctuations (Yializis, col 5, lines 50-55) and the desire for a stable plasma is well known in the plasma/deposition arts.

Regarding claims 3 and 4, Figure 4 of Yializis shows a film (item 14) to be treated which is passed on the roller/counter electrode (col 5, lines 5-15). And Yializis teaches that it is "well known" that an atmospheric plasma can be generated with the insertion of a dielectric layer between the two electrodes, where one electrode (counter) is a

rotating drum (col 2, lines 10-20). It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the use of a dielectric-coated roller as a counter electrode as taught in the plasma treatment method of Yializis to the glow discharge plasma silica film forming method of Koinuma as the dielectric coating and setup are "known" and the roller would allow a continuous feed mechanism for continuous processing (i.e. increased throughput).

Claims 1-5 and 7-8 are rejected under 35 U.S.C. 103(a) as obvious over Yializis (6,118,218) and in view of Koinuma (EP0617142A1).

Yializis teaches an atmospheric plasma treatment method forming a glow discharge plasma based on a porous electrode and a counter electrode covered by a dielectric (abstract). Yializis teaches the use of a perforated electrode which allows gas to flow through the apetures (col 5, lines 47-55).

Yializis teaches that the treatment may be used for chemical vapor deposition for barrier films in the packaging industry (col 10, lines 36-41does not specifically teach the application of a silicon film on a substrate.

Koinuma teaches a glow discharge plasma between two electrodes, a balancing gas (hydrogen), a carrier gas (argon), a substrate and a gas flow of 0.26 m/s (Example 1, page 4) and a TEOS concentration of up to 10,000 ppm.

It would have been obvious to one of ordinary skill in the art at the time of the invention to apply the use of a tetraalkylorthosilicate gas to create a silica film via glow discharge plasma as taught by Koinuma to the atmospheric plasma treatment method

of Yializis because such silica deposited films are well known in the food wrapping and other packaging industries (Koinuma, page 2, lines 22-25).

Regarding claim 3, Figure 4 of Yializis shows a film (item 14) to be treated which is passed on the roller/counter electrode (col 5, lines 5-15).

Regarding claim 4, Yializis teaches that it is "well known" that an atmospheric plasma can be generated with the insertion of a dielectric layer between the two electrodes, where one electrode (counter) is a rotating drum (col 2, lines 10-20).

Regarding claim 5, Koinuma teaches the use of TEOS (col 3, lines 34-36).

Regarding claim 7, Koinuma teaches the use of TEOS up to 10,000 and a process at atmospheric pressure.

Regarding claim 8, Yializis teaches varying the size and shapes of the pores in the electrode, and even the use of a metal cloth to create the pores (col 6, lines 4-39). It is obvious that the flow rate through the pores (i.e. perforations) is dictated by the size, shape and distribution of the pores, as well as the gas flow rate(s). It would have been obvious to one of ordinary skill in the art at the time of the invention to vary the dimensions of the pores to vary the gas flow velocity.

Claim 11 is rejected under 35 U.S.C. 103(a) as obvious over Koinuma (EP0617142A1) as applied to claim 1 and in further view of Slootman (5,576,076).

Koinuma teaches a glow discharge plasma between two electrodes, a balancing gas (hydrogen), a carrier gas (argon), a substrate and a gas flow of 0.26 m/s (Example 1, page 4) based on a flame size of 5mm (page 3, line 24).

Koinuma does not teach a result of the surface energy of the deposited film.

Slootman teaches a TEOS film deposited via an atmospheric glow discharge process, where the glow discharge is created using two electrodes, one which is dielectric-covered (col 1, lines 21-26; col 2, lines 48-56 and 59-65). Slootman teaches results of several experiments where the surface tension is greater than 58 dynes/cm. While the results presented by Slootman are not using the same starting precursor as taught by Koinuma, the results are indicative of the desired surface energy of such work and one may expect similar results from various sources of silicon (which are taught by Koinuma). It therefore would have been obvious to try the same experiment as taught by Koinuma in view of Slootman and determine the surface energy.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSEPH MILLER JR whose telephone number is (571)270-5825. The examiner can normally be reached on Monday through Thursday from 8am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil, can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

/JOSEPH MILLER JR/
Examiner, Art Unit 4162

JM
August 28, 2008

/Melvin C Mayes/
Primary Examiner, Art Unit 1791